Abstract

This project sought to develop diverse methodological approaches to address environmental justice (EJ) concerns of relevance to air pollution regulation in California. The project consisted of several interlocking research projects, including: 1) a landscape analysis of environmental hazard and air pollution burden disparities in the Bay Area; 2) development of an Environmental Justice Screening Method (EJSM) to identify areas of environmental justice concern with regard to the cumulative impacts of hazard proximity, air pollution, exposure and estimated health risk, and social vulnerability; 3) the implementation of the EJSM to evaluate a hypothetical siting of a power plant facility; 4) a statewide analysis of the association between ambient pollution exposures and adverse perinatal outcomes; 5) the implementation of a community-based participatory ground truthing research project to evaluate the coverage of emissions inventory databases of localized emission sources and sensitive receptors and to build community confidence in the research and regulatory process. Overall, our study results indicate that environmental disparities do exist, even when controls are introduced for spatial dependence. The analysis also suggests that linguistic isolation matters, a variable that may be of special interest for assessing community capacity for civic engagement in the regulatory process. We also found that ambient air pollution is associated with lower birth weight and preterm birth. In our analysis we also assessed for effect modification – that is, we examined whether the relationship between air pollution exposures and poor perinatal outcomes were amplified for certain racial/ethnic groups or by the level of neighborhood poverty. We found that effect modification by area and individual-level measures of race and socio-economic status (SES) were not consistent in terms of changes in effect estimates and statistical significance. We also developed a robust and flexible screening method that offers a scientifically valid and transparent way to examine and rank neighborhoods within regions based on EJ concerns. This method also performs well when used to evaluate potential EJ concerns related to siting decisions which may be useful for future regulatory assessments of the likelihood of community reaction to disproportionate burdens. The method is a screening tool to guide decision-making, not for risk assessment; as the community-based participatory component of this project demonstrates, secondary databases and emissions inventories do not capture the full scope of potentially hazardous emission sources, sensitive land uses, or air quality problems on a localized scale. Instead the EJSM can provide an important first step to guide decision-making regarding further research, community outreach, and regulatory strategies to better address environmental justice concerns related to air pollution impacts across diverse communities in California.